

APPROVED ADMIXTURES FOR USE IN CONCRETE

The list of Approved Admixtures For Use In Concrete is published and updated periodically for reference primarily by Caltrans field personnel and others involved in Caltrans projects.

As per State of California, Department of Transportation, Standard Specifications (July 1999), Section 90-4.03, no admixture brand shall be used in the work unless it is on Caltrans current list of approved brands for the type of admixture involved. Admixture brands will be considered for addition to the approved list if the manufacturer of the admixture submits to the Transportation Laboratory, 5900 Folsom Blvd., Sacramento, CA 95819-4612, a sample of the admixture accompanied by certified test results, which verify that the admixture complies with the requirements in the appropriate ASTM Designation. The sample shall be sufficient to permit performance of all required tests. Approval of admixture brands will be dependent upon a determination as to compliance with the specifications, based on the certified test results submitted, together with any tests the Department may elect to perform.

Inquires regarding this list, are to be directed to Dr. Vijay Jain, (916) 227-7232; his email address is vijay_jain@dot.ca.gov.

The Approved List includes only those admixtures that comply with the following ASTM designations:

C494	- Standard Specification for Chemical Admixtures for Concrete.	pp. 3 - 10
C260	- Standard Specification for Air-Entraining Admixtures for Concrete.	pp. 11 - 12
C618	- Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolan for use as a Mineral Admixture in Portland Cement Concrete.	pp. 13 - 14
C1240	Standard Specification for use of Silica Fume as a Mineral Admixture in Hydraulic-Cement Concrete, Mortar and Grout	p. 15

The list provides certain essential data for field reference as well as general information that may assist in assessing properties of the plastic concrete.

The information contained herein, shall not to be used for advertising purposes, nor is it an endorsement by Caltrans.

From ACI 212.1R, "Admixtures for Concrete"

5.2 - COMPOSITION

The materials that are generally available for use as water-reducing admixtures and set-controlling admixtures fall into five general classes:

1. Lignosulfonic acids and their salts
2. Modifications and derivatives of lignosulfonic acids and their salts
3. Hydroxylated carboxylic acids and their salts
4. Modifications and derivatives of hydroxylated carboxylic acids and their salts
5. Other materials, which include:

- (i) inorganic materials, such as zinc salts, borates, phosphates, chlorides
- (ii) amines and their derivatives
- (iii) carbohydrates, polysaccharides, and sugar acids
- (iv) certain polymeric compounds, such as cellulose ethers, melamine derivatives, naphthalene derivatives, silicones, and sulfonated hydrocarbons.

These admixtures can be used either alone, or in combination with other organic or inorganic substances, active or essentially inert substances.

NOTES:

* Chemical admixtures containing chlorides as Cl in excess of one percent by weight of admixture shall not be used in pre-stressed or reinforced concrete.

** When the Contractor is permitted to reduce cement content by adding chemical admixtures, the dosage of admixture shall be the dosage used in ASTM Designation C494 for qualifying the admixtures.

*** This admixture contains more than 1% chlorides as determined by California Test 415 and shall not be used in prestressed or reinforced concrete.

AE = Air Entrained

NAE = Non-Air Entrained

- Type A - Water-reducing admixtures
- Type B - Retarding admixtures
- Type C - Accelerating admixtures
- Type D - Water-reducing and retarding admixtures
- Type E - Water-reducing and accelerating admixtures
- Type F - Water-reducing, high range admixtures
- Type G - Water-reducing, high range and retarding admixtures

ASTM C494 Chemical Admixtures for Concrete

					At the qualifying ASTM dosage(s), what changes are expected relative to the reference concrete?			Dosage rate suggested by manufacturer
Product name	ASTM type	Class or composition	Chloride content* %	Dosage rates used to qualify for appropriate ASTM tests**, fl. oz. Per 100 lbs. of cement (report date)	Water reduction %	Change in AEA dose needed to maintain air content	Initial set retardation, (acceleration) hours	fl. oz. per 100 lbs of cement

W. R. Grace and Company
7237 East Gage Ave.
Los Angeles, CA 90040

ADVA Cast	F	Carboxylated Polyether	<1	6.3 (1997)	AE 15.3	More	AE 1.4	3.0 to 12.0
ADVA Cast 555	F	Polycarboxylate	<1	10.0 (2006)	AE 23.6	Less	AE 1.0	8.0 to 20.0
ADVA Flow	F	Carboxylated Polyether	<1	6.0 (1995)	AE 12.8	More	AE 1.1	3.0 to 12.0
ADVA 100	F	Carboxylated Polyether	<1	5.2 (1999)	AE 15.5	More	AE 0.0	3.0 to 10.0
ADVA 140	A, F	Carboxylated Polyether	<1	4.2 (2002)	AE 5.6	More	AE 0.3	4.0 to 20.0
ADVA 170	F	Carboxylated Polyether	<1	4.5 (2003)	AE 12.3	More	AE 0.4	3.0 to 9.0
ADVA Cast 500	F	Carboxylated Polymer	<1	6.1 (2001)	AE 11.9	More	AE 0.3	3.0 to 12.0
ADVA Cast 530	F	Carboxylated Polymer	<1	4.0 (2002)	AE 16.3	Less	AE 0.6	3.0 to 10.0
ADVA Cast 540	F	Carboxylated Polymer	<1	6.0 (2002)	AE 13.5	Less	AE 0.6	5.0 to 20.0
Daracem 50	A	Lignin, Calcium Chloride, and Polymers	>8	5.0 (1992)	AE 7.6	Less	Negligible	5.0 to 7.0
Daracem 55	A	Lignin, Calcium/Sodium Nitrate, Polymer	<1	4.0 (1992)	AE 5.8	Less	AE 0.9	3.0 to 9.0
Daracem 100	A, F, G	Naphthalene Sulfonate	<1	8.0 (1991)	AE 11.5	Less	AE 0.3	9.0 to 11.0
Daracem ML 330	F	Melamine-Formaldehyde Polymer	<1	14.5 (1998)	AE 15.4	More	AE 1.2	6.0 to 25.0
Daracem 19	A, F	Naphthalene-Sulfonate Formaldehyde Copolymer	<1	8.0 to 25.0 (1981)	AE 20 to 30	Less	AE 0.5 to 1.0	8.0 to 25.0
Daracem 65	A	Lignosulfonates, Melamine Polymer and Amine	<1	5.8	AE 6.7	Less	AE 0.7	3.0 to 9.0
Daraset 200	C	Calcium Nitrate/Nitrite Based Solution	<1	30.0 (1998)	AE 8.3	More	AE (2.6)	10 to 100
Daratard 17	B, D	Hydroxylated Organic Compounds	<1	3.0 (1992)	AE 8	More	AE 2.0	2.0 to 7.0
DCI	C	Calcium Nitrite Aqueous Solution	<1	78.0 (1979)	Negligible	Same	AE (2.0)	50.0 to 170.0
Mira 70	A, F	Carboxylated Polyether	<1	12.0 (1999)	AE 12.0	More	AE 0.7	2.5 to 15.0

ASTM C494 Chemical Admixtures for Concrete

Product name	ASTM type	Class or composition	Chloride content* %	Dosage rates used to qualify for appropriate ASTM tests**, fl. oz. Per 100 lbs. of cement (report date)	At the qualifying ASTM dosage(s), what changes are expected relative to the reference concrete?			Dosage rate suggested by manufacturer fl. oz. per 100 lbs of cement
					Water reduction %	Change in AEA dose needed to maintain air content	Initial set retardation, (acceleration) hours	

Mira 92	A, F	Carboxylated Polyether	<1	5.0 (2004)	AE 4.9	Same	AE (0.2)	2.5 to 15.0
Polarset	C	Calcium Nitrate/ Nitrite Solution	<1	30.0 (1994)	AE 5	Same	AE (3.0)	8.0 to 100.0
Recover	D	Hydroxycarboxylic Acid Salts	<1	5.0 (1992)	AE 9.0	Same	AE 1.7	2.0 to 16.0
WRDA 20	A	Glucose Polymers, Lignosulfonate, and Amine	<1	2.5 (1985)	AE 6.8	Less	AE 1.0	2.5
WRDA 27	A, D	Modified Glucose Polymer	<1	3.0 (2003)	AE 6.7	More	AE 0.5	2.0 to 6.0
WRDA 64	A	Lignosulfonate, Amine, and Glucose Polymer	<1	3.0 (1979)	AE 11	Less	AE 1.4	3.0 to 5.0
WRDA 79	A, D	Modified Lignosulfonate	<1	5.0 to 7.5 (1980)	AE 8 to 10	Less	AE 1.0 to 2.2	4.0 to 10.0
WRDA 82	A	Lignosulfonate & Amine	<1	3.0 (1983)	AE 6.1	Less	AE 0.2	3.0
WRDA w/Hycol	A	Organic Compounds w/Hydration Control Agent	<1	3.0 and 5.0 (1974)	AE 5 to 7	Less	AE (0.3) to 1.3	3.0 to 5.0
Zyla 610	A	Carbohydrates & Amine	<1	2.0 (2004)	AE 5.2	Less	AE 0.3	2.0 to 4.0

Hill Brothers Chemical Company
1675 N. Main Street
Orange, CA 92667-3442

HICO 610	A	Sodium Lignosulfonate	<1	5.0 (1987)	NAE 5.7	Not Tested for Air Entrained Concrete	NAE (1)	5.0 to 12
HICO 911	C	Polymer Modified Calcium Chloride	>33	24.0 (1992)	NAE 2.7	Not Tested for Air Entrained Concrete	NAE (2.0)	32 to 64

BASF Admixtures, Inc.
23700 Chagrin Boulevard
Cleveland, OH 44122

Delvo Stabilizer	B, D	Salts of Organic Agent	<1	4.0 (1992)	AE 7.8	Less	AE 1.1	2.0 to 130
Glenium 3000 NS (formerly Rheobuild)	A, F	Based on Glenium Technology	<1	4.0 (1998)	AE 12.4	Less	AE 0.2	4.0 to 6.0

ASTM C494 Chemical Admixtures for Concrete

					At the qualifying ASTM dosage(s), what changes are expected relative to the reference concrete?			Dosage rate suggested by manufacturer
Product name	ASTM type	Class or composition	Chloride content* %	Dosage rates used to qualify for appropriate ASTM tests**, fl. oz. Per 100 lbs. of cement (report date)	Water reduction %	Change in AEA dose needed to maintain air content	Initial set retardation, (acceleration) hours	fl. oz. per 100 lbs of cement

Glenium 3030 NS	A, F	Based on Polycarboxylate Technology	<1	6.0 (2001)	AE 36.6	Less	AE (0.1)	6.0 to 18.0
Glenium 3200 HES	A, F	Based on Polycarboxylate Technology	<1	3.5 (2001)	AE 26.4	Less	AE (0.1)	2.0 to 14.0
Glenium 3400 NV	A, F	Based on Polycarboxylate Technology	<1	4.8 (2004)	AE 16.4	Less	AE 1.1	2.0 to 12.0
Masterpave + (Plus)	A	Polymer, Triethanolamine	<1	3.0 (2005)	AE 5.5	Less	AE 0.9	3.0 to 7.0
Masterpave N	A	Glucose Polymer	<1	2.0 (1989)	AE 6.0	Less	AE 0.4	2.0 to 4.0
Polyheed 997	A, F	Lignosulfonate Triethanolamine	<1	5.0 (1990)	AE 6.9	Less	AE 0.4	3.0 to 12.0
Polyheed 997	F	Lignosulfonate, Triethanolamine	< 1	8.0 (1990)	AE 12.3	Less	AE 0.3	3.0 to 12.0
Polyheed 1025	A, F	Glenium Technology	<1	4.0 (2003)	AE 9.0	Less	AE 0.7	3.0 to 12.0
Polyheed RI	B, D	Cement Dispersing Agent	<1	4.0 (1994)	AE 7.6	Less	AE 1.25	3.0 to 12.0
Polyheed FC 100	A, C, E	Cement Dispersing Agent	<1	9.0 and 15.0 (1998)	AE 6.7	More	AE (0.7)	8.0 to 30.0
Pozzolith NC 534	C	Cement Dispersing Agent	<1	27.0 (1993)	AE 5.7	More	AE (1.7)	10.0 to 45.0
Pozzolith 122 HE	C, E	Cement Dispersing Agent	>24	17.0 (1998)	AE 5.5	More	AE (1.1)	16.0 to 64.0
Pozzolith 200 N	A, B, D	Cement Dispersing Agent	<1	4.0 (1998)	AE 6.9	Less	AE 0.7	3.0 to 5.0
Pozzolith 220 N	A, B, D	Polymer, Triethanolamine	<1	3.5 (1991)	AE 5.8	Less	AE 1.8	2.0 to 5.0
Pozzolith 300-R	B, D	Polymer	<1	5.0 (1990)	AE 10	Less	AE 2.6	3.0 to 5.0
Pozzolith 322-N	A	Polymer, Triethanolamine	<1	4.0 (1990)	AE 8.0	Less	AE 0.7	3.0 to 7.0
Pozzolith 80	A, B, D	Cement Dispersing Agent	<1	3.0 (1998)	AE 6.8	Same	AE 0.2	4.0 to 10.0
Pozzutec 20	C, E	Polymer	<1	15.0 (1990)	AE 5.5	More	AE 1.1	5.0 to 90.0

ASTM C494 Chemical Admixtures for Concrete

					At the qualifying ASTM dosage(s), what changes are expected relative to the reference concrete?			Dosage rate suggested by manufacturer
Product name	ASTM type	Class or composition	Chloride content* %	Dosage rates used to qualify for appropriate ASTM tests**, fl. oz. Per 100 lbs. of cement (report date)	Water reduction %	Change in AEA dose needed to maintain air content	Initial set retardation, (acceleration) hours	fl. oz. per 100 lbs of cement

PS 1466	A, F	Polycarboxylate	<1	2.0 (2005)	AE 11.6	Less	AE 0.6	2.0 to 10.0
Rheobuild 1000	A, F	Naphthalene Sulfonate	<1	15.0 (1988)	AE 18	Less	AE 0.4	5.0 to 25.0
RMC 121	A	Lignosulfonate Triethanolamine	<1	5.0 (1990)	AE 6.9	Less	AE 0.4	3.0 to 12.0
RMC 121	F	Lignosulfonate Triethanolamine	<1	8.0 (1990)	AE 12.3	Less	AE 0.3	3.0 to 12.0
Rheocrete CNI	C	Calcium Nitrite Based	<1	1.0 (2001)	AE 4.8	More	AE (1.5)	18.5 to 110

Sika Corporation
201 Polito Avenue
Lyndhurst, NJ 07071

Plastocrete 161	A	Lignosulfonate	<1	4.0 (1982)	AE 7.7	Same	AE 0.2	3.0 to 5.0
Plastocrete 161 FL	C	Inorganic Salt-Organic Mixture	<1	16.0 (1987)	AE 5.4	Same	AE 1.25	12.0 to 24.0
Plastocrete 161 HE	C	Calcium Chloride Triethylamine	>5	34.0 (1978)	AE 1.3	Less	AE (1.0)	6.0 to 64.0
Plastocrete 161 MR	B, D	Lignosulfonates	<1	2.9 (1989)	AE 7.4	Same	AE 2.4	3.0 to 6.0
Plastocrete 169	A	Lignosulfonates	<1	4.0 (1985)	AE 8.73	Same	AE (0.25)	3.0 to 7.0
Plastocrete 169	B, D	Lignosulfonates	<1	6.0 (1986)	AE 22	Same	AE 2.3	3.0 to 7.0
Plastiment	B, D	Hydroxylated Carboxylic Acid	<1	4.0 (1990)	AE 7.3	Same	AE 3.1	2.0 to 4.0
Plastiment NS	A	Lignosulfonates	<1	4.0 (1996)	AE 7.6	Less	AE 1.1	2.0 to 4.0
Sika CNI	C	Calcium Nitrate Based	<1	19.0 (2000)	AE 2.9	Same	AE 1.1	15 to 120
Sikament FF	F	Melamine Polymer	<1	12.0 (1994)	AE 12.2	Same	AE 1.3	10.6 to 21.2
Sikament MP	A, F	Polycarboxylate	<1	15.9 (2000)	AE 12.9	Same	AE (0.1)	3.0 to 16.0
Sikament 86	F	Melamine Polymer	<1	12.0 (1994)	AE 14.4	Same	AE 0.7	10.6 to 21.2
Sikament 300	F	Blend Sodium AlkylNaphthalene	<1	12.0 (1992)	AE 12.2	Same	AE 1.0	6.0 to 24.0
Sikament 686	A, F	Triethanolamine	<1	6.5 (2005)	AE 18.6	Less	AE (1.0)	3.0 to 18.0

ASTM C494 Chemical Admixtures for Concrete

					At the qualifying ASTM dosage(s), what changes are expected relative to the reference concrete?			Dosage rate suggested by manufacturer
Product name	ASTM type	Class or composition	Chloride content* %	Dosage rates used to qualify for appropriate ASTM tests**, fl. oz. Per 100 lbs. of cement (report date)	Water reduction %	Change in AEA dose needed to maintain air content	Initial set retardation, (acceleration) hours	fl. oz. per 100 lbs of cement

Sika Rapid 1	C	RMF-1503	<1	20.0 (1996)	AE 3.1	Less	AE (1.6)	4.0 to 48.0
Sika Set NC	C, E	Calcium Nitrate	<1	24.0 (2005)	AE 13.0	Less	AE 1.7	10.0 to 45.0
Sika ViscoCrete 2100	A, F	Polycarboxylate	<1	4.7 (2005)	AE 22.3	Less	AE (0.3)	2.0 to 12.0
Sika ViscoCrete 4100	A, F	Polycarboxylate	<1	3.6 (2005)	AE 18.6	Less	AE (0.9)	3.0 to 12.0
Sika ViscoCrete 6100	A, F	Polycarboxylate Polymer	<1	6.0 (2003)	AE 23.4	Less	AE (0.8)	3.0 to 8.0

The Euclid Chemical Company
 19218 Redwood Road
 Cleveland, OH 44110-2799
 Tel. No: (216) 531-9222

Accelguard HE	E	Calcium Chloride based Material	31-35	24.0 (1997)	AE 6.3	More	AE (1.5)	16 to 32
Accelguard NCA	C, E	Calcium Nitrate	<1	6.0 (2002)	AE 9.1	More	AE (1.1)	4.0 to 75
Accelguard 90	C, E	Calcium Nitrate	<1	60.0 (2005)	AE 14.5	More	AE (2.3)	10 to 90
Eucon ACN	C, E	Blend of Admixture	<1	60.0 (1998)	AE 8.6	More	AE (1.6)	20.0 to 50.0
Eucon ACN 200	C, E	Calcium Nitrate	<1	50.0 (1999)	AE 6.5	More	AE (3.4)	10.0 to 60.0
Eucon CIA	C, E	Calcium Nitrite	<1	6.2 (2004)	AE 6.7	More	AE (1.9)	45 to 135
Eucon DS	B	Phosphate Salts	<1	4.0 (1998)	AE 3.0	Less	AE 1.2	
Eucon HC	A, B, D	Carbohydrate Salts	<1	2.5 (1998)	AE 6.5 AE 7.3	Same Same	AE 0.6 AE 2.0	2 to 6
Eucon HW	A	Lignin Family	<1	6.0 (1998)	AE 6.9	Less	AE 1.0	3 to 10
Eucon LR	A, D	Lignosulfonate	<1	6.0 (1997)	AE 8.0	Less	AE (1.1)	4.0 to 6.0
Eucon LW	A	Lignin Family	<1	3.0 (1997)	AE 9.5	Less	AE 0.3	3 to 10
Eucon MR	A	Calcium Nitrate & Calcium Lignosulfonate Material	<1	6.0 (1999)	AE 7.1	Same	AE 1.1	4 to 10

ASTM C494 Chemical Admixtures for Concrete

Product name	ASTM type	Class or composition	Chloride content* %	Dosage rates used to qualify for appropriate ASTM tests**, fl. oz. Per 100 lbs. of cement (report date)	At the qualifying ASTM dosage(s), what changes are expected relative to the reference concrete?			Dosage rate suggested by manufacturer fl. oz. per 100 lbs of cement
					Water reduction %	Change in AEA dose needed to maintain air content	Initial set retardation, (acceleration) hours	

Eucon NR	A, D	Lignosulfonate Based Material	<1	3.0 (1997)	AE 6.7	Less	AE (1.2)	3.0 to 6.0
Eucon NW	A, D	Lignosulfonate Based Material	<1	3.0 (1997)	AE 7.5	Less	AE (0.2)	3.0 to 6.0
Eucon RD1	F, G	Sulfonated Naphthalene Formaldehyde	<1	4.0 (1990)	AE 15.3	Same	AE (1.0)	6.0 to 20.0
Eucon SP	A, F	Sulfonated Napthalene Formaldehyde Condensate	<1	7.0 (1998)	AE 17.1	More	AE (0.2)	6.0 to 25.0
Eucon SPC	A, F	Polycarboxylated Polymer & other additives	<1	5.0 (2001)	AE 13.2	Same	AE (0.1)	3.0 to 6.0
Eucon SPJ	A, F	Polycarboxylate Polymer	<1	7.0 (2001)	AE 12.9	Same	AE 0.8	4.0 to 7.0
Eucon TR	B, D	Carbohydrate Salts	<1	4.0 (1998)	AE 6.8	Less	AE 3.1	3 to 6
Eucon WR	A	Calcium-Sodium Lignosulfonate	<1	5.0 (1997)	AE 8.3	Less	AE 0.5	4 to 5
Eucon WR-91	A	Calcium Lignosulfonate	<1	3.0 (1999)	AE 6.4	Less	AE 0.6	2 to 6
Eucon X-15	A	Lignosulfonate Based Material	<1	4.0 (1993)	AE 5.4	Less	AE (0.1)	3.0 to 10.0
Eucon X-20	A, F	Lignin Family	<1	13.0 (2002)	AE 12.3	Less	AE 1.1	3.0 to 15.0
Eucon 37	A, F	Napthalene Sulfonate	<1	16.0 (1999)	AE 18.31	Same	AE 0.7	10 to 16
Eucon Retarder 100	D	Sodium Gluconate	<1	3.0 (1999)	AE 6.4	Less	AE 1.9	2 to 6

Fritz-Pak Corporation
11220 Grader Street, Suite 600
Dallas, TX 75238

Delayed Set	B, D	Modified Lignosulfonate	<1	3.0 (2001)	AE 7.5	Less	AE 1.2	1.0 to 1.7
FR-1	D	Formaldehyde	<1	2.5 (2001)	AE 7.5	Less	AE 1.1	1.5 to 2.0
Supercizer #1	F	Formaldehyde	<1	7.0 (2001)	AE 12.5	Less	AE 0.4	5.0 to 7.0
Supercizer #5	F	Formaldehyde	<1	6.0 (2001)	AE 14.6	Less	AE 0.2	5.0 to 7.0
Supercizer #7	F	Formaldehyde	<1	6.0 (2001)	AE 15.5	Less	AE 1.4	4.0 to 12.0

ASTM C494 Chemical Admixtures for Concrete

					At the qualifying ASTM dosage(s), what changes are expected relative to the reference concrete?			Dosage rate suggested by manufacturer
Product name	ASTM type	Class or composition	Chloride content* %	Dosage rates used to qualify for appropriate ASTM tests**, fl. oz. Per 100 lbs. of cement (report date)	Water reduction %	Change in AEA dose needed to maintain air content	Initial set retardation, (acceleration) hours	fl. oz. per 100 lbs of cement

Axim Italcementi Group
P.O. Box 234
8282 Middlebranch Road
Middlebranch, OH 44652
Tel. No: (330) 966-0444

Catexol 800N	B, D	Lignosulfonate	<1	4.3 (2002)	AE 8.8	Less	AE 1.3	2.0 to 6.0
Catexol 1000R	B, D	Lignosulfonate	<1	2.5 (2001)	AE 5.9	Less	AE 1.6	1.5 to 4.0
Catexol 1000 SPMN	F	Sulfonated Napthalene Condensate	<1	10.0 (2000)	AE 13.1	Less	AE (0.3)	10.0 to 40.0
Superflux 2000 PC	F	Polycarboxylated Polymer	<1	2.5 (2000)	AE 13.1	Less	AE (0.2)	3.0 to 10.0
Catexol 2000 RHE	C, E	Calcium Nitrate	<1	16.0 (2001)	AE 5.5	More	AE 1.4	10.0 to 20.0

Chryso, Inc.
10600 Hwy 62, Unit #7
Charlestown, Indiana 47111-0459
Tel. No: (404) 406-7966

Chryso Fluid AG	F	Calcium Salt of Sulfonated Naphthalene Formaldehyde	<1	12.4 (2004)	16.7	More	AE 0.58	4.5 to 5.0
Chryso Fluid Optima 200	F	Modified Polycarboxylate	<1	11.6 (2004)	15.0	Less	AE 0.83	4.5 to 46.0
Chryso Fluid Premia 180	F	Modified Polycarboxylate	<1	9.3 (2004)	19.9	More	AE 0.50	4.5 to 46.0
Chryso Fluid Premia 190	F	Modified Polycarboxylate	<1	8.0 (2004)	19.2	More	AE 0.25	4.5 to 46.0
Chryso Fluid Optima 203	G	Modified Polycarboxylate	<1	11.0 (2004)	14.5	More	AE 2.08	4.5 to 46.0
Chryso Plast CER	D	Hydroxycarboxylate	<1	3.6 (2004)	5.7	Less	AE 2.33	3.0 to 9.0
Chryso Plast Omega 101	A	Modified Polycarboxylate	<1	1.9 (2004)	7.5	Less	AE 2.33	1.5 to 23.0
Chryso Plast 850	A	Sulfonated Polynaphthalene	<1	7.6 (2004)	8.4	More	AE 1.17	4.5 to 23.0
Chryso Tard CHR	B	Lignosulfonate	<1	3.2 (2004)	0.4	Less	AE 2.17	3.0 to 15.0

ASTM C494 Chemical Admixtures for Concrete

					At the qualifying ASTM dosage(s), what changes are expected relative to the reference concrete?			Dosage rate suggested by manufacturer
Product name	ASTM type	Class or composition	Chloride content* %	Dosage rates used to qualify for appropriate ASTM tests**, fl. oz. Per 100 lbs. of cement (report date)	Water reduction %	Change in AEA dose needed to maintain air content	Initial set retardation, (acceleration) hours	fl. oz. per 100 lbs of cement

Specco Industries
13087 Main Street
Lemont, IL 60439

Tel. No: (630) 257-5060

Auger Aid #1920	A	Lignosulfonate	<1	8.0 (2004)	7.0	Less	AE (0.1)	8.0 to 16.0
-----------------	---	----------------	----	------------	-----	------	----------	-------------

PRO MIX Technologies

P. O. Box 6
Allen, TX 75013

(214) 448-1891

Propel HRHE	F	Polymer	<1	6.4 (2001)	11.9	Less	AE (0.2)	2.0 to 6.4
-------------	---	---------	----	------------	------	------	----------	------------

ASTM C260 Air-Entraining Admixtures for Concrete

Product name	Class or composition	Chloride content* %	Date report was submitted	Dosage rate suggested by manufacturer, fl. oz. per 100 lbs of cement
--------------	----------------------	------------------------	---------------------------	-------------------------------------------------------------------------

BASF Admixtures, Inc.
23700 Chagrin Boulevard
Cleveland, OH 44122
Tel. No: (216) 839-7500

MBVR Standard	Vinsol Resin	<1	1991	0.4 to 4.0
MB-VR Concentrated	Vinsol Resin	<1	1992	0.4 to 4.0
MBAE-90 also called Pave Air 90	Rosin Soap	<1	1993	0.25 to 4.0
Micro-Air	Fatty acid Salts	<1	1991	1.0
Pave-Air	Vinsol Resin	<1	1992	1.0

W. R. Grace and Company
7237 East Gage Ave.
Los Angeles, CA 90040

Darex AEA	Organic Acid Salts	<1	1975	0.8
Darex II AEA	Alkaline Solution of Fatty Acid Salts	<1	1993	0.75 to 3.0
Daravair 1000	Neutralized Resin and Rosin	<1	1994	0.75 to 3.0
Daravair M	Neutralized Vinsol Resin	<1	1975	1.0
Daravair AT 60	Aqueous Solution of Neutralized Vinsol Resin, Amine and Fatty Acids	<1	1994	0.5 to 3.0

Sika Corporation
201 Polito Avenue
Lyndhurst, NJ 07071

Sika AER	Neutralized Vinsol Resin	<1	1986	0.5 to 1.5
Sika AEA 15	Sodium Salt Type Soap	<1	1983	0.5 to 1.5
Sika AEA 14	Sodium Salt of an Organic Ester	<1	1996	0.5 to 3.0
Sika Air	Resin Solution	<1	2003	0.5 to 3.0

Hill Brothers Chemical Company
1675 North Main St
Orange, CA 92667-3442

HICO-315-L	Sodium Tall Oil Fatty Acid Soap	<1	1968	0.75 to 3.0
------------	------------------------------------	----	------	-------------

ASTM C260 Air-Entraining Admixtures for Concrete

Product name	Class or composition	Chloride content* %	Date report was submitted	Dosage rate suggested by manufacturer, fl. oz. per 100 lbs of cement
--------------	----------------------	------------------------	---------------------------	-------------------------------------------------------------------------

The Euclid Chemical Company
19218 Redwood Road
Cleveland, OH 44110-2799

AEA-92		<1	1992	0.50 to 1.0
Eucon Air 40	Resin Surfactant	<1	1997	1.0
Air Mix	Vinsol Resin	<1	2004	0.5 to 1.0

Fritz-Pak Corporation
11220 Grader Street, Suite 600
Dallas, TX 75238

Air Plus		<1	2001	0.25 to 1.25
Super Air Plus		<1	2001	0.25 to 1.25

Axim Italcementi Group
P.O. Box 234
8282 Middlebranch Road
Middlebranch, OH 44652
Tel. No: (330) 966-0444

Catexol	Tall Oil & Diethyleneglycol	<1	2000	0.1 to 6.0
---------	--------------------------------	----	------	------------

Chryso, Inc.
10600 Hwy 62, Unit #7
Charlestown, Indiana 47111-0459
Tel. No: (404) 406-7966

Chryso Air NVR	Neutralized Wood Resin	<1	2004	0.3 to 7.5
Chryso Air R2		<1	2004	0.3 to 15.0

ASTM C618 Mineral Admixtures

Company name	Classification of mineral admixtures	Typical calcium oxide range in fly ash, %
<u>Fly Ash</u>		
(1) Boral Materials Technology 45 NE Loop 410 Suite 700 San Antonio, TX 78216		
(a) Mojave Fly Ash (Laughlin, Nevada)	F	8.5 to 9.9
(b) Apache Fly Ash (Cochise, Arizona)	F	3.0 to 8.0
(c) Snowflake Fly Ash (Snowflake, Arizona)	F	3.0 to 4.2
(d) Monticello Fly Ash (Monticello, Texas)	F	7.1 to 8.0
(2) Headwater Resources, Inc. 10653 S. Riverfront Parkway South Jordan, UT 84095		
(a) Centralia Fly Ash (Centralia, Washington)	F	7.6 to 8.0
(b) IPSC/Delta Fly Ash (Delta, Utah)	F	9.1 to 9.9
(c) Hunter Fly Ash (Castle Dale, Utah)	F	7.9 to 9.9
(d) Navajo Fly Ash	F	6.5 to 8.0
(e) Jim Bridger Fly Ash (Rock Spring, Wyoming)	F	6.2 to 7.5
(3) Salt River Materials Group Phoenix Cement Company 8800 East Chaparral Road, Suite 155 Scottsdale, AZ 85250-2618 Tel. No: (480) 850-5757		
(a) Cholla Fly Ash (Joseph City, Arizona)	F	3.1 to 5.0
(b) Four Corners Fly Ash (Fruitland, New Mexico)	F	2.4 to 2.8
(c) Escalante Fly Ash (Prewit, New Mexico)	F	2.5 to 4.8
(d) San Juan Fly Ash (San Juan, Waterflow, New Mexico)	F	5.8 to 7.8
(d) San Juan Fly Ash (San Juan, Waterflow, New Mexico)	F	5.8 to 7.8
(e) Gallup Fly Ash (commingled fly ash made up of Four Corners Fly Ash and San Juan Fly Ash)	F	4.1 to 9.4
(4) Mineral Resources Technologies, LLC 120 Interstate North Parkway East, Suite 440 Atlanta, GA 30339		
(a) Coronado Fly Ash (St. John, Arizona)	F	2.6 to 5.0

ASTM C618 Mineral Admixtures

Company name	Classification of mineral admixtures	Typical calcium oxide range in fly ash, %
--------------	--------------------------------------	-------------------------------------------

Fly Ash, Continued

5) Enx Inc.
9429 148th Street
Edmonton, AB Canada
Tel. No: (780) 454-4199

(a) Genessee Fly Ash

F

4.2 to 5.6

Note: Fly ash suppliers should provide the Calcium Oxide (CaO) content and the alkaline content in their fly ash to the Resident Engineer. The requirement for CaO is 10% maximum. The “total” alkaline content requirement is 5% maximum or the “available” alkali content is 1.5% maximum in fly ash, per Caltrans Standard Special Provisions.

ASTM C618 Mineral Admixtures

Company name	Classification of mineral admixtures	Typical calcium oxide range in fly ash, %
--------------	-----------------------------------------	----------------------------------------------

Natural Pozzolans

(1) Western Pozzolan Corp. 1748 Senecio Drive Larkspur, CO 80118		
(a) Lassenite SR	N	2.3
(2) Engelhard Corp. Pigments & Additives Group 101 Wood Avenue P.O. Box 770 Iselin, NJ 08830		
(a) MetaMax EF High Reactivity Meta Kaolin	N	<1
(3) Advanced Cement Technologies 435 Martin Street, Suite 2040 Blaine, WA 98231		
(a) Power Pozz High Reactivity Metakaolin	N	<1

ASTM C 1240 Silica fume

Company name	Product name
--------------	--------------

Silica Fume

- | | | |
|-----|------------------------------------------------------------------------------------------------|--------------------------|
| (1) | BASF Admixtures, Inc.
23700 Chagrin Boulevard
Cleveland, OH 44122-5554
(216) 839-7500 | Rheomac SF 100 Densified |
| (2) | W.R. Grace & Company
62 Whittenmore Avenue
Cambridge, MA 02140-1692
(617) 498-4555 | Force 10,000 D Densified |
| (3) | The Euclid Chemical Company
19218 Redwood Road
Cleveland, Ohio 44110 | Eucon MSA |
| (4) | Sika Corporation
201 Polito Avenue
Lyndhurst, NJ 07071 | Sikacrete 950 DP |